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# Agricultural Market Liberalization and Household Food Security in Rural China

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# Cornhusker Economics

## Agricultural Market Liberalization and Household Food Security in Rural China

Market Report	Year Ago	4 Wks Ago	7-20-18
<b>Livestock and Products,</b>			
<b>Weekly Average</b>			
Nebraska Slaughter Steers, 35-65% Choice, Live Weight. . . . .	120.00	109.00	*
Nebraska Feeder Steers, Med. & Large Frame, 550-600 lb. . . . .	*	187.76	160.00
Nebraska Feeder Steers, Med. & Large Frame 750-800 lb. . . . .	171.94	154.39	162.05
Choice Boxed Beef, 600-750 lb. Carcass. . . . .	207.88	218.65	204.32
Western Corn Belt Base Hog Price Carcass, Negotiated . . . . .	82.89	77.79	66.68
Pork Carcass Cutout, 185 lb. Carcass 51-52% Lean. . . . .	102.94	84.53	81.14
Slaughter Lambs, woolled and shorn, 135-165 lb. National. . . . .	182.28	162.41	162.44
National Carcass Lamb Cutout FOB. . . . .	431.08	374.39	383.96
<b>Crops,</b>			
<b>Daily Spot Prices</b>			
Wheat, No. 1, H.W. Imperial, bu. . . . .	3.83	4.20	4.61
Corn, No. 2, Yellow Columbus, bu. . . . .	3.41	3.38	3.44
Soybeans, No. 1, Yellow Columbus, bu. . . . .	9.22	8.66	7.78
Grain Sorghum, No.2, Yellow Dorchester, cwt. . . . .	5.75	5.10	5.31
Oats, No. 2, Heavy Minneapolis, Mn, bu. . . . .	3.26	2.89	2.82
<b>Feed</b>			
Alfalfa, Large Square Bales, Good to Premium, RFV 160-185 Northeast Nebraska, ton. . . . .	165.00	*	180.00
Alfalfa, Large Rounds, Good Platte Valley, ton. . . . .	82.50	107.50	110.00
Grass Hay, Large Rounds, Good Nebraska, ton. . . . .	80.00	105.00	100.00
Dried Distillers Grains, 10% Moisture Nebraska Average. . . . .	105.00	115.00	105.00
Wet Distillers Grains, 65-70% Moisture Nebraska Average. . . . .	39.50	38.50	36.83
<b>* No Market</b>			

Recent World Trade Organization (WTO) disputes have brought China's agricultural trade policy back into the spotlight. In November 2008, China issued the nation's first Outline of Medium and Long-term Plan for National Food Security (China Central People's Government, 2008), in which they stipulate that the country will seek to stabilize the area sown to grain and achieve more than 95% grain self-sufficiency. Trade restrictions are argued to support implementing this plan because increased imports of grains and soybeans will lower prices, causing grain and soybean farmers to leave farming, thereby generating food insecurity (Wong and Huang, 2012). Others suggest that China may not have a comparative advantage in grain or soybean production, and switching to higher-value agriculture or working off-farm could increase the incomes of both rich and poor farmers (Zhu, Hare, and Zhong, 2010). In this article, we evaluate the effect of past agricultural market liberalization on rural Chinese household food security as a measure of household welfare. Because market liberalization is likely to differ in its effect across households, we explore the distributional effect of liberalization on rural household food security. We find that liberalization primarily improves household food security by increasing off-farm income, and the effects vary greatly by initial food security status and producer types.

Prior to its accession to the WTO in 2001, China substantially reformed its agricultural markets, prices and trade. From 1992 to 1998, the average agricultural import tariff rate fell from 42% to 24%, and domestic agricultural policy reforms dramatically decreased market distortions (MOFTEC, 2001; Huang et al., 2009). The government lowered the mandatory amount of grain farmers had to sell to the govern-

ment, called the grains quota, and reduced the price disparity between in-quota versus out-of-quota sales, fully eliminating the grains quota around 2000. The government also decentralized much of the agricultural trading authority, reduced the scope of non-tariff barriers and relaxed licensing procedures for some crops (Huang and Chen, 1999). Over the same time, the government invested heavily in infrastructure and significantly reduced transaction costs in domestic agricultural markets (Fan, Zhang and Zhang, 2004; Fan and Chan-Kang, 2005; Luo et al., 2007).

Agricultural production value, off-farm income and household food security rose over this time. We find that the share of calories from non-staples (SCNS) in rural China increased by 5 percentage points, from 21% in 1989 to 26% in 2000, where a SCNS of greater than 16% is a reasonable measure of being out of hunger (Jensen and Miller, 2010). That said, rural poverty and food insecurity are still a salient concern. Economic growth has been concentrated in urban areas and urban incomes are now more than three times higher than their rural counterparts. Poverty remains primarily a rural phenomenon, with 99% of the poor in China coming from rural areas (World Bank, 2009). In 2010, 152 million people (11.2%) in rural China still lived under the poverty line of less than \$1.90 per person per day (World Bank, 2014), and in 2015, 133.8 million people were food insecure with food intake insufficient to meet daily energy requirements (FAO, 2015). Improving access to adequate quantity and diversity of nutrients in rural areas is a major objective for Chinese policy makers (Mangyo, 2008; Huang and Rozelle, 2009; de Brauw and Mu, 2011).

We identify the effect of market liberalization by noting that while liberalization is largely driven by central government policies, it will affect each community differently. Some markets are more isolated than others and will be less affected by the decrease in protection from the world market. We measure the degree of local market liberalization by using the price difference between world, regional and local prices for seven agricultural products. This metric captures both transportation costs and policies such as non-tariff barriers that are hard to quantify.

Following Jensen and Miller (2010), we use the household's share of calories from non-staples as our measure of food security. We control for time-invariant unobserved household characteristics through household fixed effects and agro-climatic shocks and general economic trends through county by year dummy variables. To isolate the effects of liberalization on food security solely through income, we also control for other potential channels through which liberalization could affect household food security, namely demographics, changes in market access, information and food prices. By using a longitudinal household survey (the China Health and Nutrition Survey, CHNS), we can analyze the impacts of liberalization econometrically without

restrictive assumptions such as complete markets and perfect information common in simulation models of trade liberalization.

Agricultural market liberalization may affect different rural households differently. While wealthy and well-educated farmers may benefit from increased off-farm work opportunities and income (Wang et al., 2009), the poorest farmers may lack access to income-generating assets, credit and technology, and thus have limited ability to switch production or seek off-farm jobs, making them vulnerable to market liberalization (Chen and Ravallion, 2004; Anderson, Huang and Ianchovichina, 2004). Conversely, agricultural market liberalization can improve agricultural efficiency, increase rural household income of the poor and enhance household access to food (Kennedy and Cogill, 1988; Ingco, 1997; Huang, Li and Rozelle, 2003; Huang et al., 2007).

Trade theory would predict that producers of export-oriented products (hereafter called export producers) benefit from agricultural market liberalization and producers of import-competing products (hereafter called import producers) may lose from liberalization (Huang, Li and Rozelle, 2003; Huang et al., 2007). While prior research has studied how economic reforms affect the distribution of *urban* residents' nutrition availability (e.g. Meng, Gong and Wang, 2009), it is unclear how liberalization affects the food security of the full distribution of households living in rural areas.

Existing research on the effect of agricultural reforms largely focuses on how liberalization affects agricultural production value and thereby farmers' welfare. But off-farm jobs can be an effective way for farmers to raise income and reduce rural poverty (Rozelle, 1996; de Janvry, Sadoulet and Zhu, 2005; de Brauw and Giles, 2018). Based on the CHNS, from 1989 to 2000, off-farm income gradually increased from 30% to 50% of total rural income. Therefore, unlike much previous research, we analyze how agricultural market liberalization affects farmers both through agricultural production value and off-farm income.

Because food-secure and insecure households face different tradeoffs from market liberalization, we use Instrumental Variable Unconditional Quantile Regressions to study the distributional effects of market liberalization on household food security while addressing the endogeneity of agricultural production and off-farm income. This article is the first empirical application that addresses the endogeneity of *continuous* regressors when analyzing the unconditional distributional effects. By comparing effects at several points on the unconditional distribution of SCNS, this article can evaluate the impact of market liberalization on the most vulnerable population.

We find that the largest effect of liberalization is through facilitating off-farm employment, particularly for food-secure households. An average food-secure export and import household increases their consumption of calories from non-staples by 9,633 and 6,179 calories per person per year, a consumption equivalent to 12.7 and 8.1 pounds of pork (13.6% and 11.4% increase) respectively. By relaxing the grains quota, farmers had more freedom to work off-farm, potentially increasing their income. Further, market liberalization may have caused some farmers and local processors to specialize in the production of agricultural products in which China has a comparative advantage. This specialization may have increased the demand for labor. We also find that market liberalization does not substantially improve food security for food-insecure households. In particular, import-producing households who are food insecure appear to be worse off after agricultural market liberalization. Specifically, agricultural market liberalization causes food-insecure import producers to decrease their caloric intake by 2,129 calories per person per year; the same calories provided by 2.8 pounds of pork (28.2% decrease). Our findings suggest that while some farmers clearly benefited from market liberalization, some food-insecure rural households may have been left behind. Agricultural market liberalization may have contributed to inequality in income and level of food security in rural China.

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